2004 WEST NILE VIRUS OUTBREAK IN CALIFORNIA: CHARACTERIZATION OF EQUINE CASES

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Acknowledgements

The authors would like to thank Johnny Tran, Dr. Ollie Kenagy, Dr. Carol Adams, Dr. Mel Swartz, Dr. Mike Poulis, Bethann Palermo, Kirsteen Defuentes, Kathy Adams, Dr. Sharon Hietala and Michelle Davidson.

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Background

West Nile virus (WNV) was first detected in New York in 1999 and has spread westward having its first major impact on California (CA) in 2004. WNV surveillance in CA is comprised of five components; sentinel chicken flock, mosquito pool, dead bird, human, and equid testing. The objective here is to describe the 2004 WNV outbreak in CA horses, document the characteristics of the disease, and assess overall outcome.

Methods

Equine surveillance was enhanced through correspondence and educational outreach activities with veterinarians, veterinary and public health laboratories and the equine industry. Equine WNV testing through the CA Animal Health and Food Safety Laboratory was offered at no cost. Testing included IgM capture ELISA, PCR, virus isolation, and serum neutralization. Positive results were reportable to the CA Department of Food and Agriculture. A standardized questionnaire was utilized to capture relevant data from the owner and/or attending veterinarian, either in person, via phone, or via the mail.

Study sample: Reported horses that met the CA case definition for clinical WNV infection.

Case definition: Compatible clinical signs of WNV infection, residency in CA at the time of exposure, and a positive laboratory test result(s).

Vaccination status: Proper (according to vaccine manufacturer's recommendations); improper (outside regimen recommended by manufacturers)

Data analysis: Data were analyzed using EpiInfo and Microsoft Excel. For equine and human cases in which date of onset of clinical signs was unavailable, onset date was estimated using the mean difference between dates of onset and reporting from the dataset as a whole.

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Results

Horses as a WNV surveillance tool: WNV was detected in all 58 CA counties during 2004 by at least one surveillance system.

- WNV was detected in horses first in 3 counties.
    - These counties had low population density [human population/square mile: Alpine (1.6), Inyo (1.8), Colusa (16.3)] in comparison with all CA counties (1st quartile = 25.3; median = 92.3).
- WNV was detected in both horses and humans in 21 counties (WNV positive horses were detected prior to WNV human cases in 9 counties, and after human cases in 12 counties). When viral activity was detected in horses prior to humans, the mean time between detections was 21.3 days [95% CI (8.1, 34.6); range 3 to 50 days].

Characteristics of equine cases: 1423 horses were tested for WNV; 540 cases were identified. Cases were distributed in 32 of 58 counties from June – November, 2004 (Fig. 1 - 3).

- 229 horses (42.4%) were reportedly dead (29, 12.7%) or euthanized (200, 87.3%).
- 302 horses (55.9%) survived; 9 (1.7%) unknown.

- Gender, age, outcome, and vaccination status are summarized in Tables 1-3.

Table 1: Demographics of Reported WNV Equine Cases, 2004

Category	N (%)	Statistics	
Age (yrs)	479 (88 %)	Mean	15.2
		SD	8.0
		Range	0.4 - 35
Gender	518 (96 %)	Mare	274 (53 %)
		Gelding	213 (41 %)
		Stallion	31 (6 %)

Table 2: Case Fatality Rate (CFR) of Reported WNV Equine Cases by Age and Vaccination Status, 2004

Category		N	CFR (%)
Age (yrs)	< 9	118	27.1
	9-14	112	36.6
	15-20	125	44.8
	> 20	124	61.3
Vaccination Status	None	356	44.9
	Improper	145	32.4
	Proper	22	54.5

Figure 1: Prevalence* of WNV Cases in Tested Horses, CA, 2004 (by county of residence)

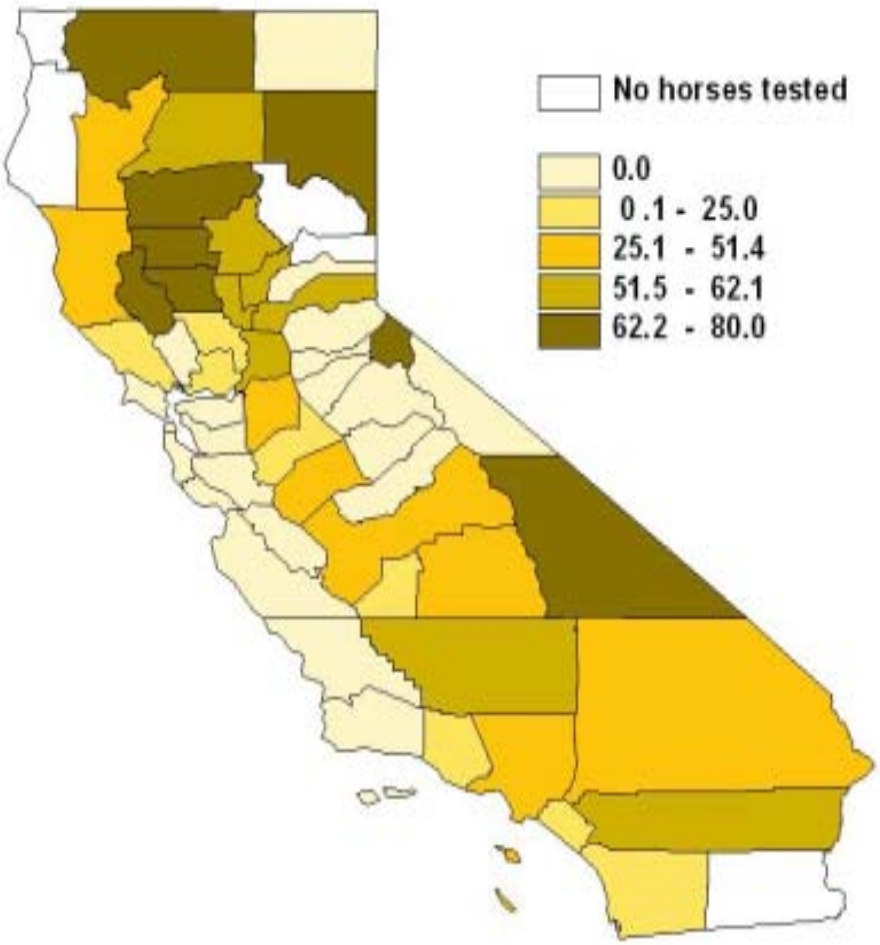


Figure 2: Reported Equine WNV Cases, CA, 2004

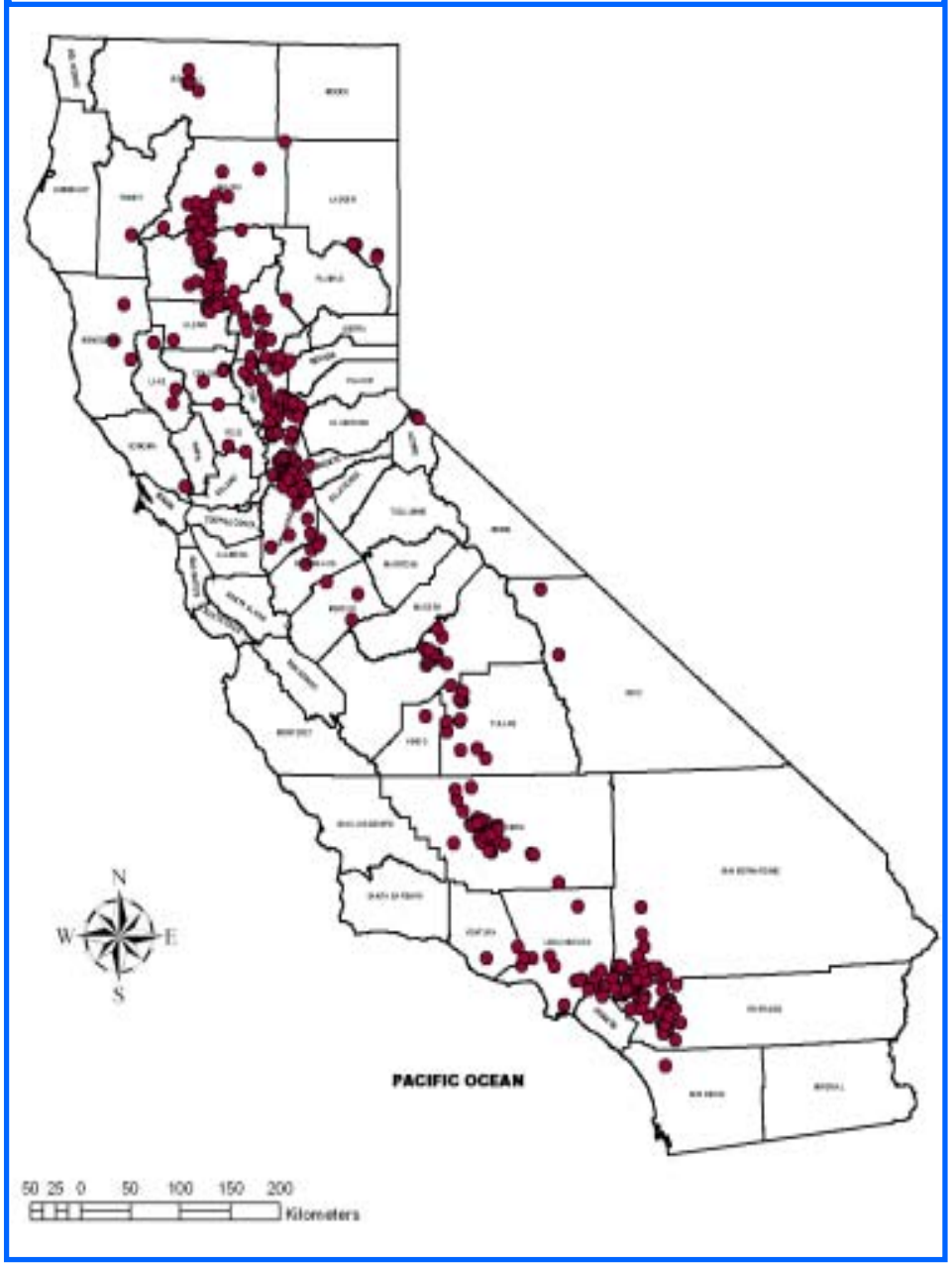
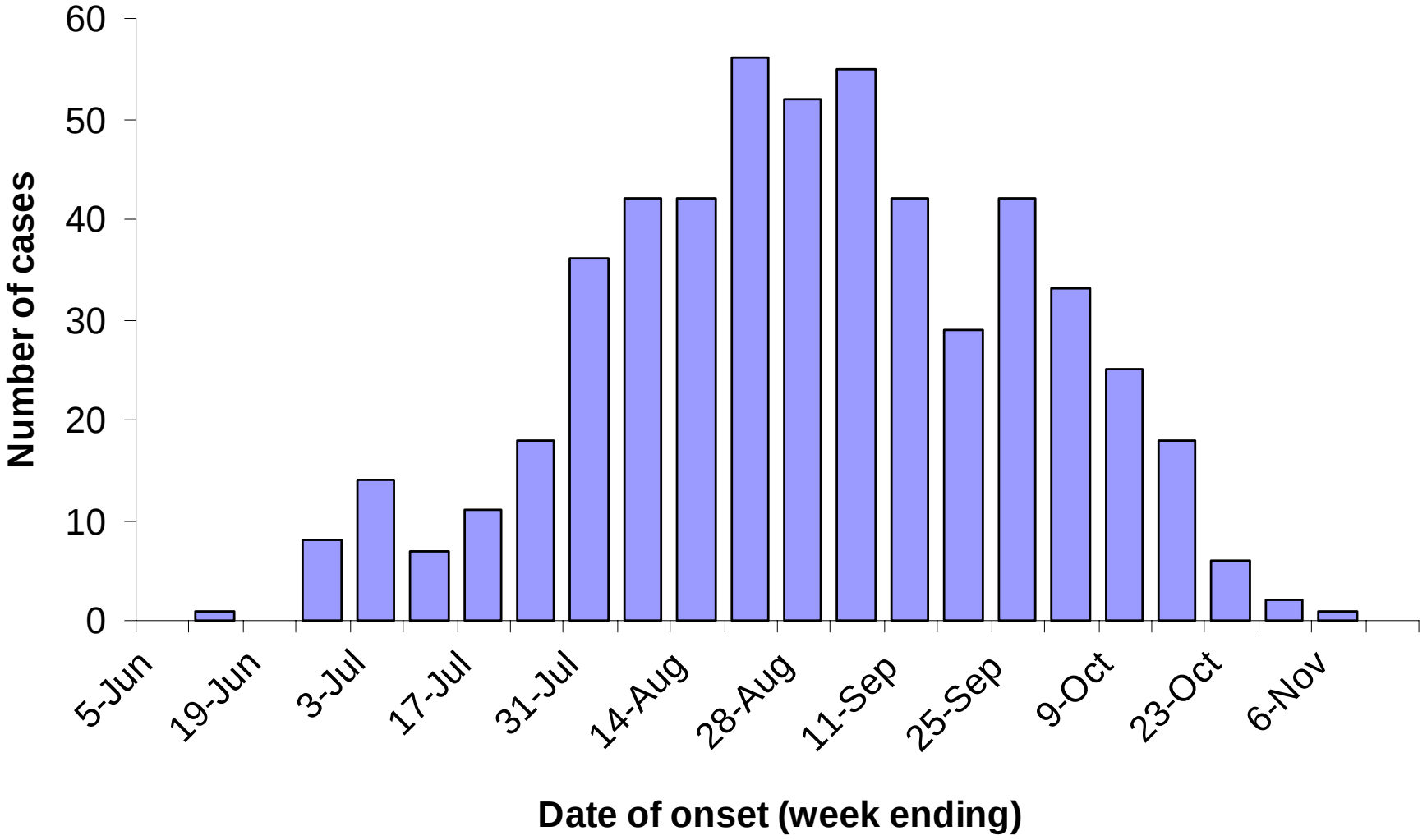


Table 3: Vaccine Products Used in Properly Vaccinated WNV Equine Cases, 2004

Outcome	N	Vaccine Reportedly Used (%)	
		Innovator™	Unknown
Dead/euthanized	12	7 (58%)	5 (42%)
Alive	10	8 (80%)	2 (20%)

Figure 3: Reported Equine WNV Cases, California, 2004



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Summary and Conclusions

• This study enabled us to characterize equine WNV in 2004 in California; the first year with significant impact in this state.

•While WNV is a reportable disease, many equine cases are neither confirmed nor reported.

•The majority of reported cases had not been properly vaccinated.

•Although not as sensitive as other surveillance systems WNV detection in equids serves as a useful tool, especially in less populated counties.